

Message

From: d'Almeida, Carolyn K. [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=9EC4401AFA1846DD93D52A0DDA973581-CDALMEID]
Sent: 3/15/2017 7:01:59 PM
To: Davis, Eva [Davis.Eva@epa.gov]; Dan Pope [DPope@css-inc.com]
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

I think Amec has already answered this. They have clearly stated before that the RAO as stated in the RODA is for benzene and says nothing about LNAPL.

Carolyn d'Almeida
Remedial Project Manager
Federal Facilities Branch (SFD 8-1)
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(415) 972-3150

"Because a waste is a terrible thing to mind..."

From: Davis, Eva
Sent: Wednesday, March 15, 2017 11:41 AM
To: Dan Pope <DPope@css-inc.com>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

Maybe a good question for Amec on tomorrow's call is, what do they expect the condition of the source zone will be ~ 20 years from now if we agree to let them go forward now with EBR

From: Dan Pope [mailto:DPope@css-inc.com]
Sent: Wednesday, March 15, 2017 1:33 PM
To: Davis, Eva <Davis.Eva@epa.gov>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

I imagine that if EBR works wonderfully well, there will still be huge amounts of LNAPL left for a long time.

What I actually expect to happen is that EBR will work fairly well for BTEX+N in GW, and will slightly increase the rate of flux of BTEX+N from LNAPL, so that BTEX+N is slowly depleted in the more accessible masses of LNAPL (i.e., in the smaller masses of LNAPL, with good GW circulation around them). Then much of this depleted LNAPL will remain for many years.

The larger masses, and less accessible masses, of LNAPL will also remain, and BTEX+N will be very slowly depleted from these larger/less accessible masses over long, long periods of time.

From: Davis, Eva [mailto:Davis.Eva@epa.gov]
Sent: Wednesday, March 15, 2017 1:24 PM
To: Dan Pope; d'Almeida, Carolyn K.
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

I wonder if ADEQ really understands that SEE removed LNAPL, but EBR at best will only remove the more soluble compounds, and that LNAPL will remain. The modeling done as part of the TEE pilot study designated ~ 55% of the

LNAPL as inert. So if Amec's estimate of mass out there is anywhere near correct, > 200,000 gallons of LNAPL will remain after a 'successful' EBR

From: Dan Pope [mailto:DPope@css-inc.com]
Sent: Wednesday, March 15, 2017 12:39 PM
To: Davis, Eva <Davis.Eva@epa.gov>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

Yep. The study didn't demonstrate much of anything, except that it's harder to do and interpret these studies than one might think.

Having said that, I would be pretty surprised if the BTEX components were not being degraded under sulfate-reducing conditions at the site. And of course degradation rates are important, but the deal-breaker is still the huge amount of source material at the site.

But if, as they claim, they can deplete LNAPL* of the BTEX+N using EBR, in a year or three, then all will be well. Assuming MNA also works as well. And all within the timeframe allotted.

There may be some uncertainty involved in the calculations, of course.

*Note that they are talking about "depleting" LNAPL, by which they mean (I think) depleting LNAPL of BTEX+N, not actually getting rid of all the LNAPL itself (i.e., not actually eliminating everything that would show up as TPH).

From: Davis, Eva [mailto:Davis.Eva@epa.gov]
Sent: Wednesday, March 15, 2017 12:21 PM
To: Dan Pope; d'Almeida, Carolyn K.
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

Yeah the microbial populations increased – **but TPH/Benzene degradation was not demonstrated** – see Tables 2-1 and 2-2

From: Dan Pope [mailto:DPope@css-inc.com]
Sent: Wednesday, March 15, 2017 11:11 AM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Cc: Davis, Eva <Davis.Eva@epa.gov>
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

EBR Field Test Report – Site ST012
Draft_ST012_RD-RAWP_Addendum2_Section2a.pdf

3.5 Recommendations

The data collected for sulfate degradation from the EBR Field Test indicates that sulfate degrading bacteria populations increased and that dispersivity values and sulfate utilization rates were more favorable than the assumed values used in the RD/RAWP EBR modeling. These findings, in combination with previous studies that concluded sulfate reduction was the dominant naturally occurring process for contaminant assimilation (BEM, 1998), indicate that sulfate amendment should be included in the EBR strategy. Sulfate amendment could either be used solely or in combination with aerobic methods to achieve remediation goals.

From: d'Almeida, Carolyn K. [<mailto:dAlmeida.Carolyn@epa.gov>]
Sent: Wednesday, March 15, 2017 10:44 AM
To: Dan Pope; Herrmann, Ronald
Cc: Davis, Eva
Subject: RE: WAFB: MODFLOW-SURFACT biodegradation component

But they still don't know if they even have sulfate reducers present

From: Dan Pope [<mailto:DPope@css-inc.com>]
Sent: Wednesday, March 15, 2017 7:33 AM
To: Herrmann, Ronald <Herrmann.Ronald@epa.gov>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Cc: Davis, Eva <Davis.Eva@epa.gov>
Subject: WAFB: MODFLOW-SURFACT biodegradation component

FWIW:

Response to EPA Review Comments
Draft Addendum #2 RD/RA Work Plan – Site ST012

The 3D groundwater model was not used to simulate biodegradation or reduction of the sulfate. 785 Although MODFLOW – SURFACT includes ACT modules that simulate biodegradation; it was 786 determined that activities at ST012 would exceed the utility of the current model. The required 787 mass of sulfate per injection well was assessed considering the distribution of contamination and 788 the sulfate-reduction stoichiometry (Appendix A and Appendix F). Based on the sulfate reduction 789 rate-kinetics analysis results (Appendix C) and considering the dispersion simulation results, 790 maintaining a sulfate concentration above 8,000 mg/L (double the half-saturation concentration) 791 will reduce the mass of injected sulfate within 4 to 8 years; at a rate of 33 to 75 mg/L per day. 792 Currently, sulfate reduction is rate-limited at a natural flux. The natural flux of sulfate into the CZ, 793 UWBZ, and LSZ is estimated at 12 tons per year (tpy), 0.23 tpy, and 0.66 tpy, respectively, 794 (Appendix E). 795

From: Herrmann, Ronald [<mailto:Herrmann.Ronald@epa.gov>]
Sent: Tuesday, March 14, 2017 2:30 PM
To: d'Almeida, Carolyn K.
Cc: Davis, Eva; Dan Pope
Subject: RE: Technical Support for Williams AFB

Carolyn, MODFLOW-SURFACT does have a biodegradation component if they used the Reaction Module. Would have to look at what they put into it there model.

From: d'Almeida, Carolyn K.
Sent: Tuesday, March 14, 2017 3:18 PM
To: Herrmann, Ronald <Herrmann.Ronald@epa.gov>
Cc: Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>
Subject: RE: Technical Support for Williams AFB

When I saw their model animation it looked like dispersion rather than degradation. ☺

Carolyn d'Almeida
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"Because a waste is a terrible thing to mind..."

From: Herrmann, Ronald
Sent: Tuesday, March 14, 2017 12:13 PM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Subject: RE: Technical Support for Williams AFB

I thought that MODFLOW was just a dispersion model. I will have to look up the surfact version to see if it includes some biodegradation rates. Wow there is still a NAS page, see link below.

https://toxics.usgs.gov/highlights/nas_2.2.0/

From: d'Almeida, Carolyn K.
Sent: Tuesday, March 14, 2017 3:03 PM
To: Herrmann, Ronald <Herrmann.Ronald@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>
Cc: Dan Pope <DPope@css-inc.com>
Subject: RE: Technical Support for Williams AFB

PS: Its been my concern all along that transport (dispersion) might be the primary "degradation" mechanism!

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"Because a waste is a terrible thing to mind..."

From: d'Almeida, Carolyn K.
Sent: Tuesday, March 14, 2017 12:01 PM
To: Herrmann, Ronald <Herrmann.Ronald@epa.gov>; Davis, Eva <Davis.Eva@epa.gov>
Cc: Dan Pope <DPope@css-inc.com>
Subject: RE: Technical Support for Williams AFB

Hi Ron

They are using MODFLOW-SURFACT which I think is more for transport; is it appropriate for modeling biodegradation and MNA?

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"Because a waste is a terrible thing to mind..."

From: Herrmann, Ronald
Sent: Tuesday, March 14, 2017 11:54 AM
To: Davis, Eva <Davis.Eva@epa.gov>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Cc: Dan Pope <DPope@css-inc.com>; Cook, Anna-Marie <Cook.Anna-Marie@epa.gov>; McKernan, John <McKernan.John@epa.gov>
Subject: RE: Technical Support for Williams AFB

Hello Everyone,

My expertise is in monitoring microbial populations *in situ* with PLFA analysis. I have worked on both bench scale and field scale projects. I have worked on PAH and PCB removal projects. Lately the majority of my work has been with biosolids land application and how quickly the microbial community recovers or doesn't recover. Also, I have been working on accessing the fate of the microbial community and PFAS in SCAS reactors.

I am interested in your project but not sure how I can help since it looks like you are looking more for a modeler for estimating plume flows. I think that something like the NAS software package from the USGS is what you are looking for. I know of this software but have not every run it, if I remember correctly it should give you the estimates that you are looking for to verify what the AF is saying. I would like to assist in any manner that you see fit.

Ronald F Herrmann
USEPA/ ORD/NRMRL
Microbiologist
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Cincinnati, Ohio 45268
(513) 569-7741

In science, as in all things, we cannot afford to be driven by our own preconceptions of how things ought to be. Rather, we owe ourselves to view the Universe exactly as it is, and to listen to the story it tells us about itself.
Ethan Siegel

From: Davis, Eva
Sent: Monday, March 13, 2017 10:38 AM
To: d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>; Herrmann, Ronald <Herrmann.Ronald@epa.gov>
Cc: Dan Pope <DPope@css-inc.com>; Cook, Anna-Marie <Cook.Anna-Marie@epa.gov>; McKernan, John <McKernan.John@epa.gov>
Subject: RE: Technical Support for Williams AFB

Ron –

I note that John's email says you are a biologist. Can you tell us more about your expertise?

Thanks Eva

From: d'Almeida, Carolyn K.
Sent: Friday, March 10, 2017 1:23 PM
To: Herrmann, Ronald <Herrmann.Ronald@epa.gov>
Cc: Davis, Eva <Davis.Eva@epa.gov>; Dan Pope <DPope@css-inc.com>; Cook, Anna-Marie <Cook.Anna-

Marie@epa.gov>; McKernan, John <McKernan.John@epa.gov>

Subject: RE: Technical Support for Williams AFB

Hello Ron

I understand you are interested in helping us at Williams ST12 former fuels spill site. We are already working with Eva Davis at the Ada lab on this project, and have bioremediation support from Dan Pope through their contract with CSS-Dynamac. The expertise we are missing on our team is in review of AFs modeling efforts for biodegradation (time to MNA), groundwater fate and transport, and evaluation of hydraulic containment. I'm attaching our most recent correspondence with AF documenting our concerns with their proposal to give you a quick overview. ST12 is a former jet fuel storage facility where leaks and spills have contaminated vadose zone and groundwater to 230' depth and rising water table (1 – 5 feet per year) has created a 120- LNAPL smear zone. Steam Enhanced Extraction was operated over a 3 acre portion of the site from Oct 2014 – April 2016, removing 2.5 million lbs of hydrocarbons, but terminated before performance objectives were met, and there may be as much as 4 million lbs remaining in the subsurface. The 2013 ROD Amendment specifies meeting MCL for benzene within 20 year time frame, and AF is proposing to use sulfate injection for enhanced anaerobic biodegradation to meet the objective.

If this project looks like a good fit for you and you would like to take it on, let me know and we can set up a call to discuss. Currently we have a meeting scheduled with AF next Thursday at 1 PM PST 3 PM CST in which AF's contractor is expected to provide a presentation of their biodegradation modeling effort.

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"Because a waste is a terrible thing to mind..."

From: McKernan, John
Sent: Friday, March 10, 2017 9:06 AM
To: Cook, Anna-Marie <Cook.Anna-Marie@epa.gov>; d'Almeida, Carolyn K. <dAlmeida.Carolyn@epa.gov>
Cc: Herrmann, Ronald <Herrmann.Ronald@epa.gov>
Subject: RE: Technical Support for Williams AFB

Hi Anna-Marie and Carolyn-

Ron Herrmann, one of our outstanding biologists here in Cincinnati, has agreed to help at this site. I'm connecting everyone through this email.

Carolyn, please feel free to reach out to Ron regarding what you need (included in the request) for the site and supplying documents to him.

Thank you, and feel free to contact Ron or me with any questions or comments.

John

John McKernan, ScD, CIH
Captain | U.S. Public Health Service
Engineering Technical Support Center ([ETSC Internet site](#))
[Technical Support Request SharePoint site](#)

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From: Cook, Anna-Marie

Sent: Thursday, March 09, 2017 6:55 PM

To: McKernan, John <McKernan.John@epa.gov>

Subject: Technical Support for Williams AFB

Hi John,

I wanted to know whether you had received the Technical Support Request I submitted last week and, if so, whether you had been able to line anyone up so that I can get back to Carolyn.

Thank you!

Anna-Marie

Anna-Marie Cook

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cook.anna-marie@epa.gov

From: d'Almeida, Carolyn K.

Sent: Thursday, March 9, 2017 10:51 AM

To: Cook, Anna-Marie <Cook.Anna-Marie@epa.gov>

Subject: Williams

Anna Marie

Any word yet on finding us some ORD modeling support for Williams? We have a call with AF scheduled for next Thursday the 16th to discuss their modelling effort; wondering if we could get someone by then

Carolyn d'Almeida

Remedial Project Manager

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